CLAIMS

[C001] 1. A radiation imaging system for generating an image of an object, the imaging system comprising:

an X-ray source disposed in a spatial relationship to the object configured to transmit X-ray radiation through the object;

at least one X-ray detecting media configured to convert the X-ray radiation transmitted through the object to optical signals;

an optical transmission conduit comprising a first end and a second end,

an optical detector configured to convert optical signals to corresponding electrical signals; and wherein the first end of the optical transmission conduit is coupled to the X-ray detection device and the second end is coupled to the optical detector.

[C002] 2. The radiation imaging system of claim 1, further comprising an image processor coupled to the optical detector and configured for processing the electrical signals to generate the image.

[C003] 3. The radiation imaging system of claim 2, wherein the X-ray detecting media comprises a plurality of scintillators.

[C004] 4. The radiation imaging system of claim 3, wherein the optical transmission conduit comprises guided optics.

[C005] 5. The radiation imaging system of claim 4, wherein each one of a plurality of optical fibers is coupled to a corresponding one of the plurality of scintillators.

[C006] 6. The radiation imaging system of claim 1, further comprising a modulator configured for modulating the optical signals.

[C007] 7. The radiation imaging system of claim 6, wherein the modulator comprises an optical amplifier configured to change an amplification factor of the optical signals.

[C008] 8. The radiation imaging system of claim 7, wherein the optical amplifier is configured to operate in a continuous wave mode.

[C009] 9. The radiation imaging system of claim 7, wherein the optical amplifier is configured to operate in a pulse-sampling mode.

[C010] 10. The radiation imaging system of claim 6, wherein the modulator comprises an optically addressed spatial light modulator.

[C011] 11. The radiation imaging system of claim 10, wherein the spatial light modulator comprises:

a photoconductive layer configured to alter conductivity in response to a reception of light from the plurality of scintillators;

a light-modulation layer configured to alter a polarization, phase or intensity factor in response to the change in conductivity of the photoconductive layer; and

a sensing device configured to read the altered light-modulation layer and generate a corresponding optical signal.

[C012] 12. The radiation imaging system of claim 1, further comprising an optical coupling mechanism configured to enhance a coupling efficiency and for directing the optical signals through the optical transmission conduit.

[C013] 13. An method for generating an image of an object, the method comprising:

transmitting X-ray radiation through the object at a predetermined location;

converting the X-ray radiation transmitted through the object to optical signals;

providing an optical transmission path for optical signals to an optical detector;

converting the optical signals to corresponding electrical signals; and

processing the electrical signals to generate the image.

[C014] 14. The method of claim 13, wherein the step of providing the optical transmission path comprises using an optical transmission conduit.

[C015] 15. The method of claim 14, wherein the step of providing the optical transmission path comprises using a plurality of optical fibers and optical waveguides.

[C016] 16. The method of claim 14, wherein the step of providing the optical transmission path comprises using a plurality of free-space optics.

[C017] 17. The method of claim 14, wherein the step of providing the optical transmission path further comprises modulating the optical signals.

[C018] 18. The method of claim 13, further comprising directing the optical signals through the optical transmission path.

[C019] 19. A computer tomography (CT) system for generating an image of an object, comprising:

an X-ray source configured to emit a stream of radiation;

at least one X-ray detecting media configured to convert the X-ray radiation transmitted through the object to optical signals;

an optical transmission conduit comprising a first end and a second end; and

an optical detector configured to convert optical signals to corresponding electrical signals; and wherein the first end of the optical transmission conduit is coupled to the X-ray detection device and the second end is coupled to the optical detector.

[C020] 20. The CT system of claim 19, wherein the X-ray source and the at least one X-ray detecting media are disposed on a gantry assembly of the CT system, wherein the gantry assembly is configured to rotate about the object being imaged.

[C021] 21. The CT system of claim 20, further comprising an optical coupling mechanism configured to couple the optical signals generated by the X-ray detecting media disposed on the gantry assembly to the optical detector.

[C022] 22. The CT system of claim 21, wherein the optical coupling mechanism comprises a micro-lens array.

[C023] 23. The CT system of claim 19, further comprising an image processor coupled to the optical detector and configured to process the electrical signals to generate the image.

[C024] 24. The CT system of claim 19, wherein the optical transmission conduit comprises guided optics.

[C025] 25. The CT system of claim 19, wherein the optical transmission conduit comprises free-space optics.